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Fermi National Accelerator Laboratory
Batavia, IL 60510

CMS ME1/2 ANODE PANEL WIRE STRIP GLUING TRAVELER

Reference Drawing(s)

Endcap Muon Chamber ME1/2 Final Assembly
5520-ME-368120

Endcap Muon Chamber ME1/2 Anode Panel Assy
520-ME-368121

Budget Code: **Project Code:**

Released by: **Date:**

Prepared by: M. Hubbard, B. Jensen, L. Lee

Title	Signature	Date
TD / E&F Process Engineering	**Bob Jensen/Designee**	
TD / E&F CMS Assembly	**Glenn Smith/Designee**	
TD / E&F Technological Physicist	**Oleg Prokofiev/Designee**	
TD / CMS Project Manager	**Giorgio Apollinari/Designee**	

Revision Page

Revision	Step No.	Revision Description	TRR No.	Date
None	N/A	Initial Release	N/A	04/26/00

Ensure appropriate memos and specific instructions are placed with the traveler before issuing the sub traveler binder to production.

1.0 General Notes

1.1 White (Lint Free) Gloves (Fermi stock 2250-1800) or Nitrile Gloves (Fermi stock 2250-2040), or equivalent, shall be worn, as required, by all personnel when handling all product parts after the parts have been prepared/cleaned.

1.2 All steps that require a sign-off shall include the Technician/Inspectors first initial and full last name.

1.3 No erasures or white out will be permitted to any documentation. All incorrectly entered data shall be corrected by placing a single line through the error, initial and date the error before adding the correct data.

1.4 All Discrepancy Reports issued shall be recorded in the left margin next to the applicable step.

1.5 All personnel performing steps in this traveler must have documented training for this traveler and associated operating procedures.

1.6 Personnel shall perform all tasks in accordance with current applicable ES&H guidelines and those specified within the step.

1.7 Cover the panel/chamber with Mylar when not being serviced or assembled.

1.8 Never hand pass anything over a panel as dropped items may damage the panel.

2.0 Parts Kit List

2.1 Attach the completed Parts Kit List for the CMS ME1/2 Anode Panel Wire Strip Gluing to this traveler. Ensure that the serial number on the Parts Kit List matches the serial number of this traveler. Verify that the Parts Kit received is complete.

_____ _____

Process Engineering/Designee Date

3.0 Anode Panel Preparation (Serial Number Side)

Completed

3.1 Acquire the completed Wire Wound Anode Panel from the Anode Panel Wire Winding area using the panel transport cart. ❒

3.2 Rotate the panel to a horizontal position with the panel serial number facing up. ❒

3.3 Install four Guide Rod Alignment Pins (MA-368895) into the four Wire Guide Brackets on the serial number side of the panel. ❒

X 3.4 Visually inspect and ensure all wires are touching all the solder pads on both sides of the panel. Visually inspect all wires that they are uniformly spaced from each other along the length of the wire fixation bars. Shift any wires that are at an uneven distance from neighboring wires. ❒

Note(s):

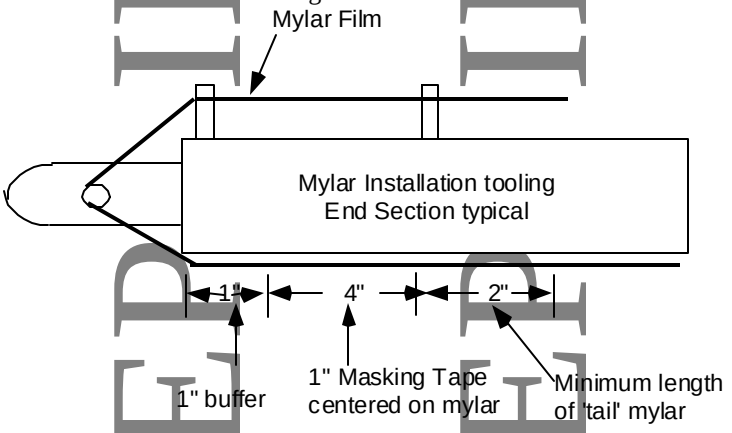
DON'T TOUCH THE WIRES WITH YOUR FINGERS/HANDS DURING THE INSPECTION!

If the wires are not contacting the solder pads or are not uniformly spaced, contact the Production Manager Immediately!!!

Lead Person _____ Date _____

3.5 Prepare two Mylar Installation Tooling Bars by cleaning with Ethyl Alcohol (Fermi Stk No 1920-0600) and a low-lint wipe (Fermi Stk #1660-2500) to remove any dirt, dusts, oils, and other foreign material from the tooling. ❒

3.6 Place the Mylar Installation tooling onto the Tape Glue Dispenser Assy (MD-368882)and install one length of mylar to each tooling bar. Ensure that each length of mylar is long enough to wrap around each end and be secured using 1" wide masking tape (Fermi Stk No. 1365-0940) to the back side of the tooling as shown below. ❒



Note(s):

Ensure that the mylar is tight. The mylar should be stretched and tight to prevent any 'curling' of the mylar. Ensure the mylar is aligned correctly in the tape supports.

Technician(s) _____ Date _____

3.7 Mix Epolite (MA-368289) parts A and B. The quantity required should be 25 grams part A (resin) to 2 grams part B (hardener). ❒

Note(s):

Always wear proper PPE when mixing and handling the epoxy.

3.8 Fill the Tape Dispenser 30cc syringe (with pink needle) with epoxy, let it sit 15 ±1 minutes after mixing epoxy to allow the air bubbles from mixing to dissipate. Record the time the epoxy started sitting and the time the epoxy started to be applied. ❒

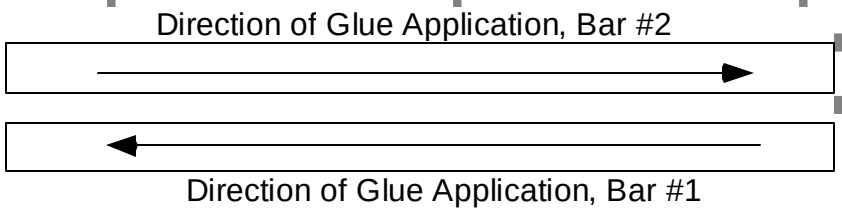
	Time
Mixed Epoxy sit start	
Epoxy application start	

3.9 Set Tape Dispenser epoxy head speed between 30 and 60, using an epoxy dispensing needle (MA-331299). Ensure pressure on the Dispenser is set to 30 psi. Set epoxy dispenser height at approximately 1/8" above the mylar. ❒

3.10 Apply Epolite glue to both mylar strips using the Tape Glue Dispenser Assy (MD-368882). Apply glue to the center of one mylar strip, then move the dispensing head and apply glue to the other mylar strip on the return trip. ❒

Note(s):

Epoxy must be applied to the mylar in a continuous length. If epoxy isn't one continuous strip, ensure those areas without epoxy are filled using the glue dispensor.



Mylar Installation Tooling

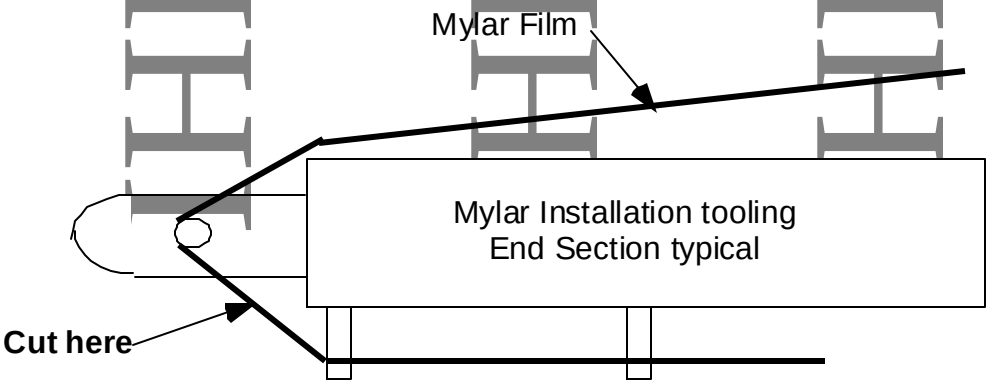
3.11 Shift the 50µm wires to the other side of the 200µm wires. ❒

Technician(s) _____ Date _____

Completed

3.12 Install the two Mylar Installation Tooling Bars onto the panel. Use the Guide Rods (MA-368895) mounted on the panel to ensure proper alignment. ❒

3.13 Ensure the tooling is properly aligned and in proper position. Approximately 3 feet from the end of the Mylar Installation Tooling Bar, put downward pressure on the mylar strip. Push downward until the mylar strip is approximately 1/8" to ¼" above the wires. Then, while maintaining pressure downward, grasp the mylar 'tail' while maintaining tension and slowly lift the masking tape. Slowly lower the mylar strip with glue onto the wires and then cut the mylar strip with scissors. ❒



Note(s):

Do NOT allow the mylar/glue to come in contact with the solder pads while lowering it into position.

3.14 Go to the other end of the Mylar Installation Tooling Bar and cut the mylar strip. ❒

3.15 Perform the same procedure to the other Mylar Glue Strip on the panel. ❒

3.16 When the mylar glue strips are cut at both ends, remove the mylar installation tooling bars, and return to the Glue Dispensing Assy. ❒

3.17 Visually inspect all wires that they are uniformly spaced from each other along the length of the wire fixation bars. Shift any wires that are at an uneven distance from neighboring wires. ❒

3.18 Record the date, start of the cure cycle, and cure cycle finish time below. Glue requires a minimum of 8 hours to be properly cured before further processing. After the required amount of time has been achieved, record this date and time below. ❒

	Date	**Time**
Glue Cure Start		
Glue Cure Finish		

Technician(s) _____ Date _____

4.0 Anode Panel Preparation (Non-Serial Number Side)

Completed

4.1 Rotate the panel to a horizontal position with the panel non-serial number side facing up. ❒

4.2 Install four Guide Rod Alignment Pins (MA-368895) into the four Wire Guide Brackets on the non-serial number side of the panel. ❒

X 4.3 Visually inspect and ensure all wires are touching all the solder pads on both sides of the panel. Visually inspect all wires that they are uniformly spaced from each other along the length of the wire fixation bars. Shift any wires that are at an uneven distance from neighboring wires. ❒

Note(s):

DON'T TOUCH THE WIRES WITH YOUR FINGERS/HANDS DURING THE INSPECTION!

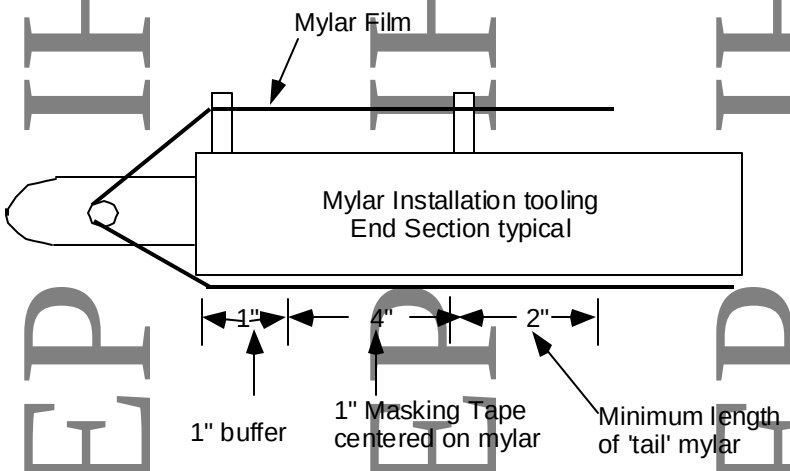
If the wires are not contacting the solder pads or are not uniformly spaced, contact the Production Manager Immediately!!!

_____ _____

Lead Person Date

4.4 Prepare two Mylar Installation Tooling Bars by cleaning with Ethyl Alcohol (Fermi Stk No 1920-0600) and a low-lint wipe (Fermi Stk #1660-2500) to remove any dirt, dusts, oils, and other foreign material from the tooling. ❒

4.5 Place the Mylar Installation tooling onto the Tape Glue Dispenser Assy (MD-368874) and install one length of mylar to each tooling bar. Ensure that each length of mylar is long enough to wrap around each end and be secured using 1" wide masking tape(Fermi Stk No. 1365-0940) to the back side of the tooling as shown below. ❒



Note(s):

Ensure that the mylar is tight. The mylar should be stretched and tight to prevent any 'curling' of the mylar. Ensure the mylar is aligned correctly in the tape supports.

_____ _____

Technician(s) Date

Completed

4.6 Mix Epolite (MA-368289) parts A and B. The quantity required should be 25 grams part A (resin) to 2 grams part B (hardener). ❒

Note(s):

Always wear proper PPE when mixing and handling the epoxy.

4.7 Fill the Tape Dispenser 30cc syringe (with pink needle) with epoxy, let it sit 15 ±1 minutes after mixing epoxy to allow the air bubbles from mixing to dissipate. . Record the time the epoxy started sitting and the time the epoxy started to be applied. ❒

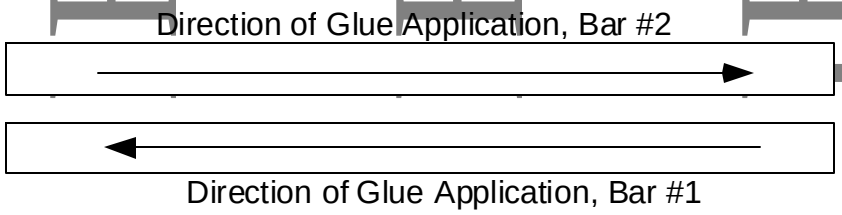
	Time
Mixed Epoxy sit start	
Epoxy application start	

4.8 Set Tape Dispenser epoxy head speed between 30 and 60 using an epoxy dispensing needle (MA-331299). Ensure pressure on the Dispenser is set to 30 psi. Set epoxy dispenser height at approximately 1/8" above the mylar. ❒

4.9 Apply Epolite glue to both mylar strips using the Tape Glue Dispenser Assy (MD-368882). Apply glue to the center of one mylar strip, then move the dispensing head and apply glue to the other mylar strip on the return trip. ❒

Note(s):

Epoxy must be applied to the mylar in a continuous length. If epoxy isn't one continuous strip, ensure those areas without epoxy are filled using the glue dispensor.



Mylar Installation Tooling

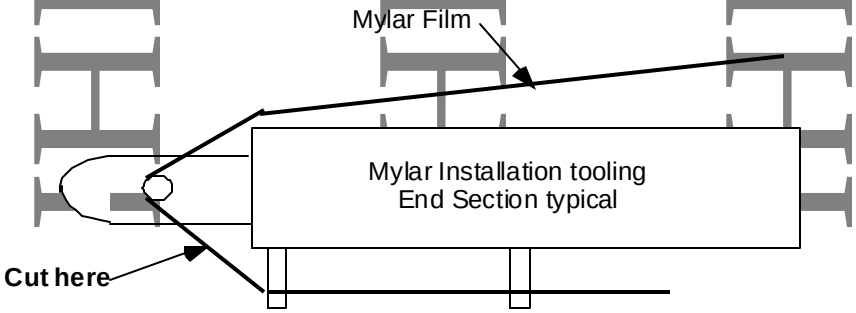
4.10 Shift the 50µm wires to the other side of the 200µm wires. ❒

Technician(s) _____ Date _____

Completed

4.11 Install the two Mylar Installation Tooling Bars onto the panel. Use the Guide Rods (MA-368895) mounted on the panel to ensure proper alignment. ❒

4.12 Ensure the tooling is properly aligned and in proper position. Approximately 3 feet from the end of the Mylar Installation Tooling Bar, put downward pressure on the mylar strip. Push downward until the mylar strip is approximately 1/8" to ¼" above the wires Then, while maintaining pressure downward, grasp the mylar 'tail' while maintaining tightness and slowly lift the masking tape. Slowly lower the mylar strip with glue onto the wires and then cut the mylar strip with scissors. ❒



Note(s):

Do NOT allow the mylar/glue to come in contact with the solder pads while lowering it into position.

4.13 Go to the other end of the Mylar Installation Tooling Bar and cut the mylar strip. ❒

4.14 Perform the same procedure to the other Mylar Glue Strip on the panel. ❒

4.15 When the mylar glue strips are cut at both ends, remove the mylar installation tooling bars, and return to the Glue Dispensing Assy. ❒

4.16 Visually inspect all wires that they are uniformly spaced from each other along the length of the wire fixation bars. Shift any wires that are at an uneven distance from neighboring wires. ❒

4.17 Record the date, start of the cure cycle, and cure cycle finish time below. Glue requires a minimum of 8 hours to be properly cured before further processing. After the required amount of time has been achieved, record this date and time below. ❒

	Date	Time
Glue Cure Start		
Glue Cure Finish		

_____ _____

Technician(s) Date

X 4.18 Visually Inspect the completed panel to ensure that all wound wires are intact and were not damaged during the wire gluing process and it's OK to Proceed to the next process.

_____ _____

Lead Person Date

5.0 Mylar Protection Installation

Completed

5.1 Apply a strip of double sided tape ¼" wide (XXXXXX) along the length of the mylar glue strip on the right side of the panel. Remove backing from the tape and install one layer of .001"thick mylar onto the tape over the wire area on the serial number side of the panel. Align the mylar edge with the edge of the mylar glue strip. Trim the ends of mylar to the ends of the panel. ❒

Note(s):

Extreme care must be used during the installation of the mylar as to not damage or break any of the wires.

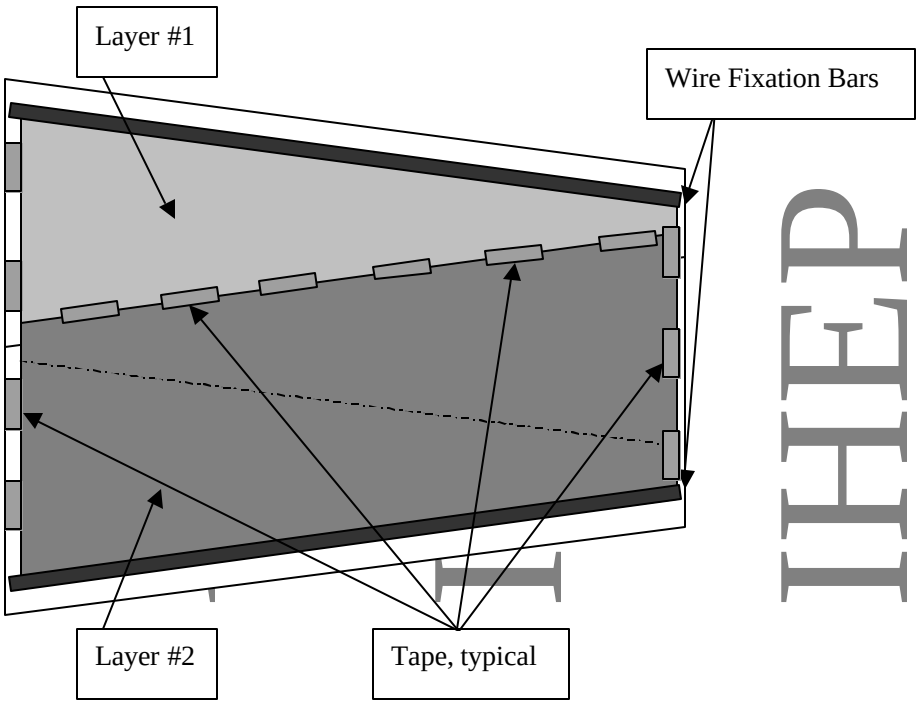
Ensure that NO tape or mylar is applied to the solder pads during the mylar installation.

5.2 Apply another strip of double sided tape ¼" wide (XXXXXX) along the length of the mylar glue strip on the left side of the panel. Remove backing from the tape and install one layer of .001"thick mylar onto the tape over the wire area on the serial number side of the panel. Align the mylar edge with the edge of the mylar glue strip. Trim the ends of mylar to the ends of the panel. Using masking tape, tape layer #2 mylar to layer #1 mylar where the layers overlap, as in the diagram below. ❒

Note(s):

Extreme care must be used during the installation of the mylar as to not damage or break any of the wires.

Ensure that NO tape or mylar is applied to the solder pads during the mylar installation.



Note(s):

Ensure that the mylar covers the mylar glue strip and there are no openings which would allow contaminants into the wire area.

Technician(s) _____ Date _____

Completed

5.3 Rotate the panel to a horizontal position with the non-serial number side facing up. ❒

5.4 Apply a strip of double sided tape ¼" wide (XXXXXX) along the length of the mylar glue strip on the right side of the panel. Remove backing from the tape and install one layer of .001"thick mylar onto the tape over the wire area on the non-serial number side of the panel. Align the mylar edge with the edge of the mylar glue strip. Trim the ends of mylar to the ends of the panel. ❒

Note(s):

Extreme care must be used during the installation of the mylar as to not damage or break any of the wires.

Ensure that NO tape or mylar is applied to the solder pads during the mylar installation.

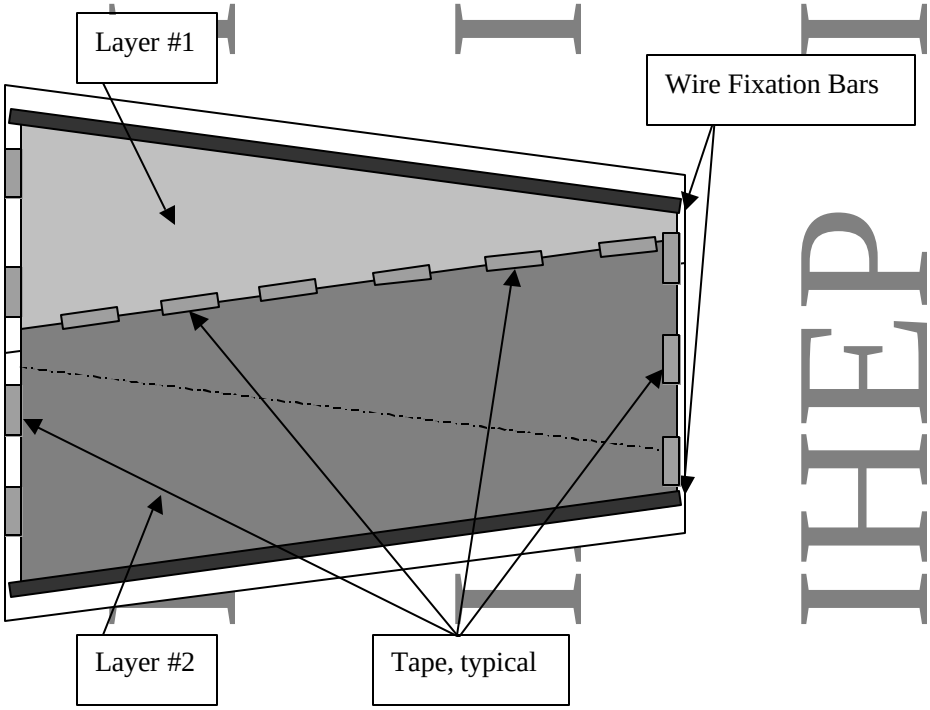
Completed ❒

5.5 Apply another strip of double sided tape ¼" wide (XXXXXX) along the length of the mylar glue strip on the left side of the panel. Remove backing from the tape and install one layer of .001"thick mylar onto the tape over the wire area on the non-serial number side of the panel. Align the mylar edge with the edge of the mylar glue strip. Trim the ends of mylar to the ends of the panel. Using masking tape, tape layer #2 mylar to layer #1 mylar where the layers overlap, as in the diagram below.

Note(s):

Extreme care must be used during the installation of the mylar as to not damage or break any of the wires.

Ensure that NO tape or mylar is applied to the solder pads during the mylar installation.



Note(s):

Ensure that the mylar covers the mylar glue strip and there are no openings which would allow contaminants into the wire area.

Technician(s) _____ Date _____

5.6 Transport the completed panel using the panel transport cart to the Wire Soldering Station Area.

Technician(s) _____ Date _____

6.0 Production Complete

XXX 6.1 Process Engineering verify that the CMS ME1/2 Anode Panel Wire Strip Gluing Traveler (5520-TR-333372) is accurate and complete. This shall include a review of all steps to ensure that all operations have been completed and signed off. Ensure that all Discrepancy Reports, Nonconformance Reports, Repair/Rework Forms, Deviation Index and dispositions have been reviewed by the Responsible Authority for conformance before being approved.

Comments:

Process Engineering/Designee Date

7.0 Attach the Process Engineering "OK to Proceed" Tag on the panel.

Process Engineering/Designee Date

8.0 Proceed to the next major assembly operation as required.